Barazangi, M., Seber, D., Al-Saad, D., and Sawaf, T., *Structure of the intracontinental Palmyride mountain belt in Syria and its relationship to nearby Arabian plate boundaries.* Proc. 1st Int. Symp. Eastern Mediterranean Geology, Bull. Earth Sci., 20, Cukurova Univ., Adana, Turkey, 111-118, 1992.

Abstract:

The intracontinental Palmyride mountain belt strikes NE and is located within the northern Arabian platform. The belt is about 400 km in length and about 100 km in width. Abundant data, including seismic reflection and refraction profiles, drill holes, gravity, magnetics, and geologic maps are used to infer the crustal structure and geologic evolution of this belt.

The Palmyrides were the site of an early Mesozoic aulacogen-type depression that was linked to the Levantine rifted continental margin in the eastern Mediterranean. Seismic stratigraphic analysis indicates that inversion of the Palmyride depression was initiated in late Cretaceous time, but especially intensified in Neogene and Quaternary times. The inversion process varies considerably along strike and involves both shortening by folding and reverse faulting (including the inversion of some of the Mesozoic rift-bounding normal faults) as well as translation and rotation along numerous strike-slip faults. The inversion processes formed at least three structurally distinct crustal blocks within the Palmyrides. The two blocks in the northeast Palmyrides (Bilas and Bishri) consist of broad anticlines that exhibit symmetrical thick-skinned deformation with reverse faults on the southern and northern flanks of the belt, whereas the southwestern Palmyrides consist of long linear ridges with intervening depressions that exhibit clear south vergence and local detachment, probably within Triassic evaporites. Depth to metamorphic basement beneath the Palmyrides increases from 9 km in the northeast to 11 km in the southwest. This is in contrast to a basement depth of about 6-8 km beneath the adjacent stable Arabian platform. A 20-25% estimated shortening across the southwestern Palmyrides has not been sufficient to invert the basement morphology beneath this mountain belt.

Close temporal relations between inversion episodes in the Palmyrides and well-documented episodes of convergence and collision along nearby Arabian plate boundaries suggest that plate boundary stresses are transmitted hundreds of kilometers across the northern Arabian platform to the Palmyrides. Finally, Bouguer gravity observations provide an estimate of crustal thickness of about 38 km beneath the Palmyrides, but also require different crustal properties to the north and south of the Palmyrides. These observations suggest that the Palmyrides occupy the location of a possible Precambrian (Proterozoic?) suture and/or strike-slip fault zone along which the two crustal blocks of northern Arabia were accreted. This possible early history may explain the subsequent development of the Palmyrides in early Mesozoic time as due to a reactivation of a zone of crustal weakness along the postulated Proterozoic suture zone.